PT5071—12V

1.5 Amp, 12V Step-Up/Step-Down Integrated Switching Regulator

EXCALIBUR

Power Trends Products from Texas Instruments

SLTS139

(Revised 2/7/2001)

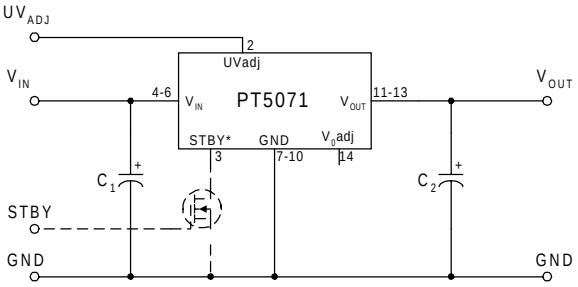
Features

- Single-Device: +12V Output, 7-16V Input
- 84% Efficiency
- 14-Pin Excalibur™ Package
- Output Current Limit
- Adjustable Output Voltage
- Adjustable Undervoltage Lockout
- Solderable Copper Case

Description

The PT5071 is a 1.5-ampere rated step-up/step-down Integrated Switching Regulator (ISR) that provides a tightly regulated 12V output voltage from a 7V to 16V variable input source. This high-performance ISR has applications in systems where the input voltage straddles the desired 12V output. The regulator has an adjustable output voltage and input start-up threshold, and a standby function for power conservation.

Standard Application



C_1, C_2 = Required 100µF electrolytic (See footnotes)

Pin-Out Information

Pin	Function
1	N/C
2	UVLO Adj
3	STBY*
4	V_{in}
5	V_{in}
6	V_{in}
7	GND
8	GND
9	GND
10	GND
11	V_{out}
12	V_{out}
13	V_{out}
14	V_{out} Adjust

Ordering Information

PT5071☐ = +12 Volts

PT Series Suffix (PT1234X)

Case/Pin Configuration	
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

(For dimensions and PC board layout, see Package Styles 1360 and 1370.)

For Inhibit pin:
Open = output enabled
Ground = output disabled

Specifications

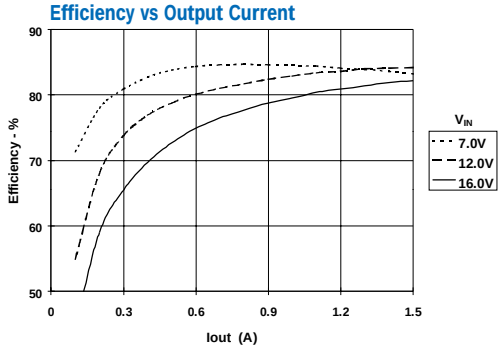
Characteristics (T_a = 25°C unless noted)	Symbols	Conditions	PT5071 Min	PT5071 Typ	PT5071 Max	Units
Output Current	I_o	Over V_{in} Range	0.1 (1)	—	1.5	A
Current Limit	I_{lim}	V_{in} = 12V	—	4.0		A
Input Voltage Range	V_{in}	0.1A ≤ I_o ≤ $I_o$max	7.0	—	16.0	V
Output Voltage Tolerance	ΔV_o	V_{in} =12V, I_o =$I_o$max –40°C ≤ T_a ≤ +85°C		±1.0		%
Output Voltage Adjust Range	$V_o$adj		10	—	15	V
Line Regulation	Reg_{line}	Over V_{in} Range, I_o =$I_o$max	—	±0.5		%
Load Regulation	Reg_{load}	V_{in} =12V, 0.1 ≤ I_o ≤ $I_o$max	—	±0.5		%
Vo Ripple/Noise	V_n	V_{in} =12V, I_o =$I_o$max	—	±2.0	±3.0	%
Transient Response with C_2 = 100µF	t_{tr} V_{os}	Load step from 50% to 100% $I_o$max, V_{in}=12V V_o over/undershoot	— —	200 1.0	— —	µSec %V_o
Efficiency	η	V_{in} =12V, V_o=12V, I_o =1.5A	—	83	—	%
Switching Frequency	f_o	Over V_{in} Range 0.1A ≤ I_o ≤ $I_o$max	—	550	—	kHz
Absolute Maximum Operating Temperature Range	T_a	Over V_{in} range	–40 (2)	—	+85 (3)	°C
Storage Temperature	T_s	—	–40	—	+125	°C
Mechanical Shock		Per Mil-STD-883D, Method 2002.3 , 1 msec, Half Sine, mounted to a fixture	—	TBD	—	G's
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, Soldered in a PC board	—	TBD	—	G's
Weight	—	—	—	25	—	grams

Notes: *1. The regulator will operate down to no load with reduced specifications.*
2. For operating temperatures below 0°C, it is recommended that tantalum capacitors be used at both the input and output.
3. See SOA curves, or contact the factory for derating guidelines.

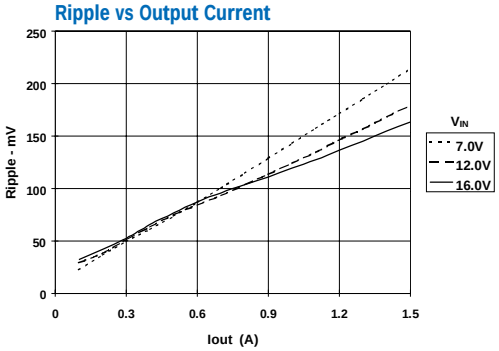
Input/Output Capacitors: *The PT5071 regulator requires a 100µF electrolytic capacitor at the input and output for proper operation in all applications. The ESR (equivalent series resistance) of both capacitors must be less than 250mΩ @100kHz. In addition, C_1 and C_2 must be rated to a minimum of 300mArms ripple current.*

PT5071 Performance, V_o =12V (See Note A)

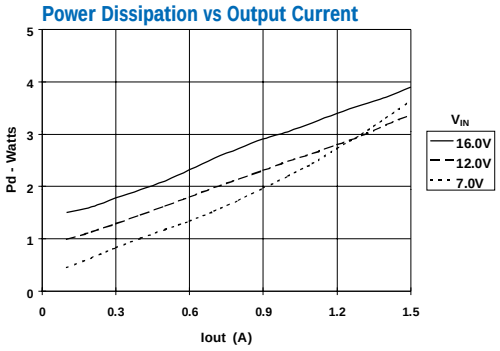
Efficiency vs Output Current



Ripple vs Output Current

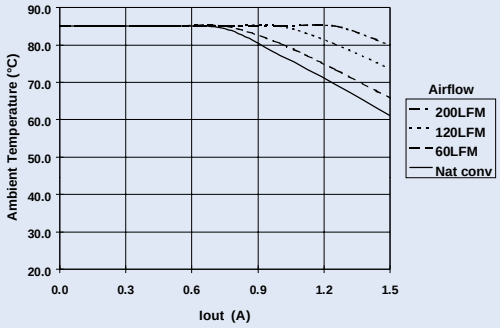


Power Dissipation vs Output Current

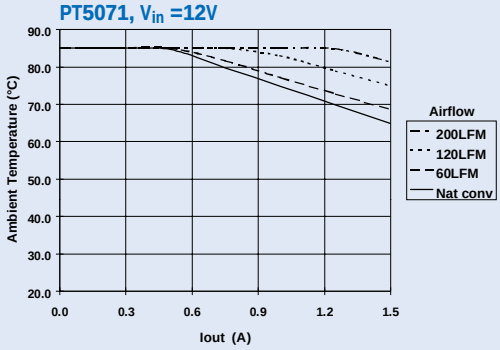


Safe Operating Area Curves (See Note B)

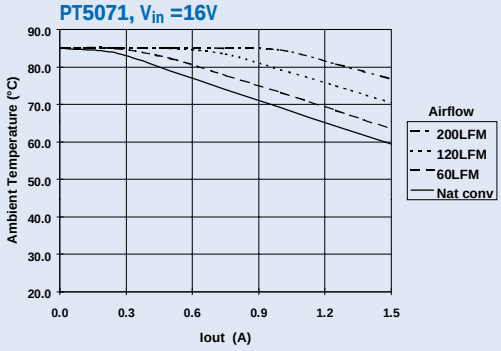
PT5071, V_{in} =7V



PT5071, V_{in} =12V



PT5071, V_{in} =16V



Note A: *All Characteristic data in the above graphs has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.*
Note B: *SOA curves represent operating conditions at which internal components are at or below manufacturer's maximum rated operating temperatures.*

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